



**ASEE-COLLEGE, LOWER DIVISION, 2001 MODEL DESIGN COMPETITION**

**Sponsored by the Two Year College Division of ASEE**

Date: October 8, 2001

Dear Colleague,

On behalf of the of the American Society for Engineering Education (ASEE) - Two Year College Division (TYCD), We invite you to encourage the submission of student design projects for the Annual College, Lower Division 2002 MODEL DESIGN COMPETITION. This event will be held in conjunction with the ASEE Annual Convention, June 16-19, 2002 in Montreal, Quebec. This competition is open to 2<sup>nd</sup> and 1<sup>st</sup> year students at four and two year Colleges and Universities.

This year a competition of battery - powered model vehicles will take place. The models must adhere to the guidelines of the model design competition and an oral presentation is included as part of the competition.

The main reason for this competition is for students to gain a better understanding of the design process from start to finish. Designing and building something from an idea is probably why they chose engineering in the first place. Use this Design Competition as a platform to reinforce their ideas and have some *engineering fun!* We hope to see you and your students' entries in Montreal.

Please find enclosed the guidelines and registration forms for this event. The interest and registration forms are on the back of this letter.

If you would like to help judge the competition in Montreal, please contact us at:

Sincerely,

Paul E. Gordy  
Phone: 757-321-7175  
Fax: 757-427-0327  
Email: PGordy@tcc.vccs.edu

William C. Beston  
Staff Associate  
National Science Foundation  
Arlington VA  
Email: wbeston@nsf.gov

**Results from the 2001 ASEE National Two Year College Model Competition in Albuquerque, NM:**

**1<sup>st</sup> Place: Cerarville University - Cedarville, OH**

**Team members:** Robert "Bobby" Casity, Michael Walker (presented at the competition), Chris Brown, Rich Lebbeda, Bonnie Hammond, Bryan Horton, Nathan Collier, David Corder, and Silas Gibbs.

**Advisor:** Dr. Clint Kohl

**2<sup>nd</sup> Place: Broome Community College – Binghamton, NY**

**Team members:** Jason Riesbeck, Dave Myers, and Jeremy Purdone

**Advisor:** Robert Lofthouse

**3<sup>rd</sup> Place: Tidewater Community College – Virginia Beach, VA**

**Team members:** Robert Sereno, Justin Taylor, Craig Byl, Brett Byers, Craig Speed, Randy Woods, Joe Concepcion, Gordon Burr, and Faith Wood.

**Advisors:** Paul Gordy and Steve Ezzell

**Web Site: Visit the following site for rules, photos, videos, and more.**

**<http://www.tc.cc.va.us/studorgs/vbeng/aseecar/index.htm>**



## ASEE-COLLEGE, LOWER DIVISION 2002 MODEL DESIGN COMPETITION

Montreal, Quebec

### MODEL COMPETITION GUIDELINES

The American Society for Engineering Education (ASEE) -College, Lower Division, Design competition will be held Monday, June 17, 2002 in conjunction with the ASEE Annual Convention in Montreal, Quebec.

#### **MODEL PROJECT:**

##### **Objective:**

To design and build a battery-powered vehicle that traverses a maze-like track to a designated turn area and returns to the original starting area as quickly as possible.

##### **Vehicle Specifications:**

###### **Allowable battery types:**

9 volt alkaline (Duracell™ MN1604 or equivalent)  
1.5 volt D alkaline (Duracell™ MN1300 or equivalent)  
1.5 volt C alkaline (Duracell™ MN1400 or equivalent)  
1.5 volt AA alkaline (Duracell™ MN1500 or equivalent)

###### **Maximum number of batteries:**

9 volt : One  
1.5 volt : Eight (any combination of D, C, and AA).

###### **Maximum vehicle size:**

Height: 5 inches  
Width: 7 inches  
Length: 15 inches

###### **Components, Fabrication and Cost:**

Team members using tools and component parts, which are commonly available to the general public must perform all fabrication. Use of a commercially available battery-powered vehicle or its components will not be allowed. The total cost of all components must not exceed \$300.

###### **Vehicle Navigation:**

The vehicle must be capable of navigating the course without any input from the team. Radio, infrared, ultrasonic, electrical, or other remote controls may not be operated by team members once the vehicle begins moving.

###### **Vehicle Inspection:**

Prior to the race the judges will inspect each vehicle for the following:

- 1) Each vehicle must meet the required specifications for dimensions, allowable batteries, etc.
- 2) Each vehicle must pass a safety inspection. Any vehicle that presents a safety hazard, or has the potential to damage any property or the track will not be allowed in the competition.

###### **Track Specifications:** (see the diagram on the next page)

- Vehicles will be tested on a non-painted, light colored, non-carpeted, BC grade plywood surface.
- The track shall be formed by placing two 4'x8' pieces of plywood end to end to form a surface that is 4'x16'.
- 2" x 2" (typical actual size is 1.5" x 1.5") boards will be fastened to the top surface of the track to form a barrier around the outer edge of the track and to form barriers which define the maze.
- 3/4" electrical tape will be placed on the track as shown on the diagram. All curves have a 16" radius.

### **Speed Test:**

In order to complete the course successfully, the vehicle must:

- 1) Begin in the Start/Stop area. The car must initially be entirely within the Start/Stop area and must not initially be touching any of the wooden barriers on the track. The judges will indicate when the car is to begin the race with a signal such as "On your mark, get set, Go!"
- 2) Travel to the Turn area. The entire car must completely enter the turn area.
- 3) Return to the Start/Stop area. The time to complete the course stops when the entire car enters the Stop/Turn area, but the entire car must also stop within the Stop/Turn area for the run to be successful. Touching the wooden barriers within the Start/Stop area is permitted.
- 4) Other requirements: Cars may touch or climb over any of the barriers except they cannot go beyond the outer edge of the barriers on the outer perimeter of the track or they will be disqualified.

### **Scoring and Test Procedures:**

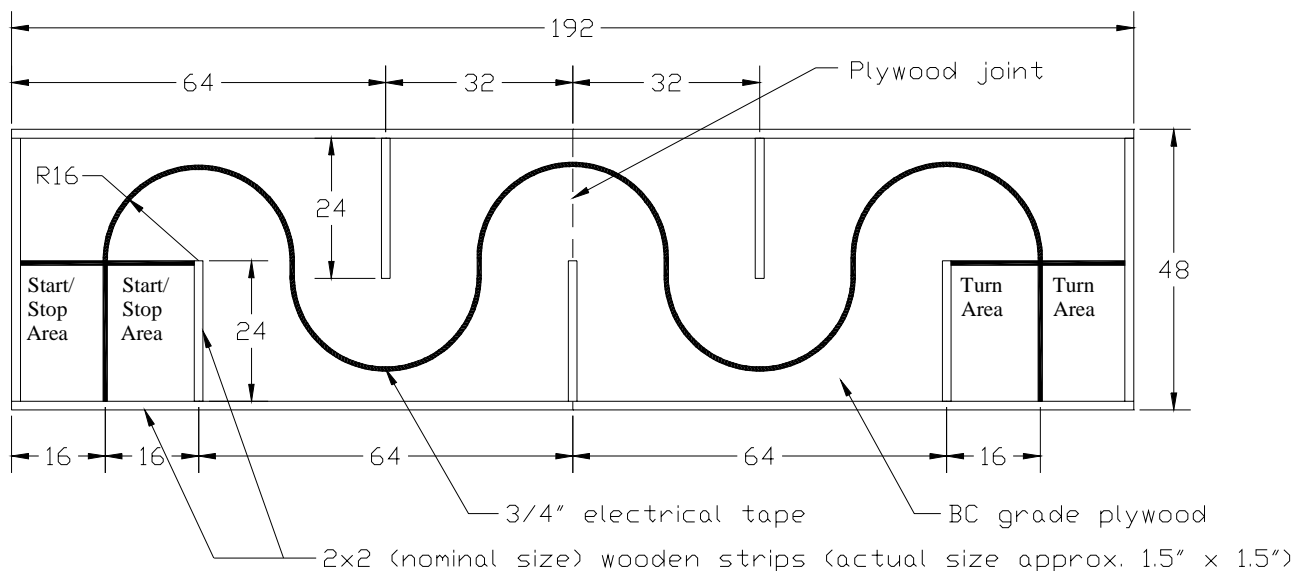
- 1) During the competition, each team may perform a maximum of three trials.
- 2) Teams may make repairs or adjustments to their vehicles between trials. No components may be added, replaced or permanently removed with the exception of programmable circuit elements and batteries.
- 3) The batteries onboard the vehicle are the only allowable source of energy.
- 4) The team may not touch or communicate with their vehicle while it is performing a test.
- 5) The object of this event is to perform the required task in the least amount of time. A team's lowest time of the trials performed will be used in the judging. If a team fails to complete the test in three trials then the team will receive zero points for the event based upon time trials. For the cars that complete the test satisfactorily, the following points will be awarded:
  - **1<sup>st</sup> place:** 55 points for the fastest car's time in seconds
  - All other teams receive a score less than 55. The number of points will be determined by taking the fraction formed by taking the fastest car's time in seconds and dividing it by their time in seconds. This fraction will then be multiplied by 55 and rounded off to the nearest whole number. This is the score for that team.
  - Judges are allowed to add up to 10 points to any team's score based upon judgment of performance criteria not specified by the competition rules.

### **Judges Discretion:**

If questions arise regarding the rules of the competition:

- Before the date of the competition: Contact Paul Gordy or Bill Beston
- On the date of the competition: Judges may be asked to clarify the rules. All decisions by the judges are final.

### **Track Diagram:**



### **Oral Presentation:**

Prior to the testing of the vehicles, each team shall make a maximum 10 minute oral presentation. The judges may reduce the actual length of the presentations if the number of entries does not allow the presentation component of the competition to be completed in a reasonable period of time. The oral presentation will be followed by up to 3 minutes of questions by the judges. If time allows the judges may allow additional questions. Only one spokesperson for each team will be allowed to ask questions if recognized by the judges. Other competing team members or spectators may not ask questions or make comments during the oral presentation or questioning period. Each team will have a maximum of 5 minutes to begin their presentation once it is their turn.

The oral presentations should include the following components (each component is worth 5 points):

1. **Problem Identification:** A description and history of why the vehicle was designed and built.
2. **Preliminary Ideas:** Problem Formulation
3. **Abstraction and Synthesis:** Refinement of goals and ideas
4. **Analysis:** Comparison and evaluation of alternate designs (Scaled drawings of the vehicle need to be included)
5. **Final Solution:** A discussion of what improvements could be made on future designs is required

In addition, the assessment of the presentation will include two components worth 5 points each.

6. **Presentation Quality and Adherence to the Guidelines of the Project**
7. **Written report:** A written summary (max of 3 pages) of the presentation shall be given to each judge (5 copies). An appendix should be included containing a parts list, detailed cost estimate, CAD drawings, and copies of the receipts or vendor price list for all parts having a retail of more than \$10 is required.

### **Scoring:**

The judges will evaluate the content and form of the oral presentation. A copy of the evaluation tool is included. Teams may receive any integer number of points between 0 and 35. The judges may give an equal score to two or more teams.

### **PROJECT TEAM / ENTRY LIMITATIONS:**

Each construction team must have at least one faculty advisor and at least 2 student members but no more than 10 student members. Each team member must primarily be enrolled in freshmen or sophomore level classes where this design project is introduced. **An identification sheet including the school name, advisor name, and team member names must accompany the car.**

### **PROJECT INTEREST AND REGISTRATION FORMS:**

Please find the entry forms on a separate page. The Interest Form must be received no later than March 1, 2002. A Registration Form for each model design team must be received no later than June 1, 2002.

### **ENTRY SUBMISSION DATE AND TIME:**

All model entries must be submitted at the judging display in the Exhibitor's area before 2:00 PM June 25, 2001. Do not leave models at the conference registration desk. Transporting the model(s) to the conference is the sole responsibility of the entering school.

### **JUDGING:**

Oral Presentations will take place Monday prior to the Vehicle competition at 10:30 AM. Specific location will be published within the ASEE Final Program and Proceedings booklet.

Vehicle judging will take place Monday afternoon, June 17, 2002 in the Exhibitor's Hall Area at about 2:00 PM.

All decisions made by the judges are final.

### **AWARDS:**

First, second, and third-place teams will receive plaques.

Please direct questions to:

Paul E. Gordy  
Tidewater Community College  
1700 College Crescent, Virginia Beach, VA 23456  
Phone: 757-321-7175  
Email: PGordy@tcc.vccs.edu  
Web page: <http://www.tc.cc.va.us/studorgs/vbeng/>

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Arlington VA  
Phone: 607-778-5344  
Email: wbeston@nsf.gov



**2002 ASEE-COLLEGE, LOWER DIVISION, 2002 MODEL DESIGN COMPETITION  
INTEREST FORM**

Number of Model Entries Expected

College/University:

Faculty Advisor Name:

Mailing Address:

City, State, Zip

Phone:

Fax:

e-mail:

Please mail to: Paul E. Gordy, Tidewater Community College  
1700 College Crescent, Virginia Beach, VA 23456  
Phone: 757-321-7175  
Fax: 757-427-0327  
Email: PGordy@tcc.vccs.edu  
<http://www.tc.cc.va.us/studorgs/vbeng/>

This form is due by March 1, 2002

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**2002 ASEE-COLLEGE, LOWER DIVISION, 2002 MODEL DESIGN COMPETITION**

**REGISTRATION FORM**

College/University:

Faculty Advisor Name:

Student Names: 1) 6)  
2) 7)  
3) 8)  
4) 9)  
5) 10)

Please mail to: Paul E. Gordy, Tidewater Community College  
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Phone: 757-321-7175  
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This form is due by June 1, 2002